

**ATTACHMENT 5.**

**Kingdom of Saudi Arabia**  
**The National Commission for Academic Accreditation &**  
**Assessment**

**T6. Course Specifications**  
**(CS)**

## Course Specifications

Institution	Umm Al Qura University	Date	April 18, 2016
College/Department	College of Computers and Information Systems		

### A. Course Identification and General Information

1. Course title and code: 14014503-3 Image Processing			
2. Credit hours 3			
3. Program(s) in which the course is offered. Computer Science (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course Curriculum Committee			
5. Level/year at which this course is offered 4th year / (level 9 or 10)			
6. Pre-requisites for this course (if any) 14012402-4 Algorithms			
7. Co-requisites for this course (if any)			
8. Location if not on main campus			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			

## B Objectives

<p>1. What is the main purpose for this course?</p> <p>This course is an introduction to digital image processing. The goal of this course is to introduce fundamental concepts, principles and tools of image processing. It further emphasis to teach students how to apply them in solving practical and real-world problems of interest.</p> <p>The course include topics: Image sampling and quantization, color, point operations, segmentation, morphological image processing, linear image filtering, image transforms, noise reduction and restoration, feature extraction and recognition tasks. Students learn to apply material by implementing and investigating image processing algorithms in Matlab.</p>
<p>2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <p>Developed by increased use of IT and wed based reference materials. Improvements are as a result of new research in the field.</p>

## C. Course Description (Note: General description in the form used in Bulletin or handbook)

<p>Course Description:</p> <p>The course include topics: Image sampling and quantization, color, point operations, segmentation, morphological image processing, linear image filtering, image transforms, noise reduction and restoration and compression.</p>
---

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Introduction and Image Processing Examples Digital Image Fundamentals (Sampling, Quantization) Point Operations Histograms	2	8
Image Enhancement Linear Image Processing and Filtering	3	12
Image transforms, noise reduction and restoration	3	12
Image Segmentation and Edge Detection	2	8
Image Compression	2	8
Morphological and Color Image Processing	2	8

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	30		30			60
Credit	1.8		1.2			3

3. Additional private study/learning hours expected for students per week.	3-4
--	-----

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy (I = Introduction P = Proficient A = Advanced)

On the table below are the five NQF Learning Domains, numbered in the left column.

**First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Students will learn image processing fundamentals and enhancements	Lectures and practice (lab) sessions	Quizzes, Homework, Lab works and Exams
1.2	learn some advanced image processing concepts of image transform, recovery and segmentations	Lectures and practice (lab) sessions	Quizzes, Homework, Lab works and Exams
	learn the concept of image compression, morphological and color image processing	Lectures and practice (lab) sessions	Quizzes, Homework, Lab works and Exams
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	ability to work on significant problems that require the understanding of key knowledge of the domain	Lectures and practice (lab) sessions	Projects
2.2			
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		

5.0	Psychomotor
-----	-------------

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)

Course LOs #	Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)								
	1.1	1.2	1.3	1.4	2.1	2.2	3.1	3.1	4.1
1.1	I			P					
1.2	P			A					
1.3	P			A					
2.1				A	A				

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Quizzes	3, 7, 13	10%
2	Home works	4, 8, 12	10%
3	Midterm	9	30%
4	Project	14	10%
5	Final	17	40%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

Office hours between 2-4 hours per week.

#### E Learning Resources

<p>1. List Required Textbooks Digital Image Processing by Rafael C. Gonzalez, Richard E. Woods (latest edition)</p>
<p>2. List Essential References Materials (Journals, Reports, etc.) Digital Image Processing Using MATLAB by Rafael C. Gonzalez, Richard E. Woods and Eddins (latest edition)</p>
<p>3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) C. Solomon and T. Breckon, Fundamentals of Digital Image processing: A Practical Approach with Examples in MATLAB, John Wiley &amp; Sons, 2011.</p>
<p>4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.</p>
<p>5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.</p>

#### F. Facilities Required

<p>Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Lecture room (max 30 students) with white board and multimedia projector Computer lab (max 15 students) with white board and multimedia projector</p>
<p>2. Computing resources (AV, data show, Smart Board, software, etc.) MATLAB Programming environment</p>
<p>3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)</p>

#### G Course Evaluation and Improvement Processes

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Student feedback forms distributed at the end of the course.</p>
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p>

3 Processes for Improvement of Teaching
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Name of Instructor: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Report Completed: \_\_\_\_\_

Name of Course Instructor \_\_\_\_\_

Program Coordinator: \_\_\_\_\_

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_